WHAT IS CLAIMED IS:

1. A microfluidic system comprising:

a body defining a microfluidic channel network and a plurality of reservoirs in fluid communication with the network, the network including a microfluidic channel;

a sensor coupled to the channel for determining a viscosity of a flow therein, the sensor and channel functioning as a viscometer.

2. The microfluidic system of claim 1, further comprising a plurality of pressure modulators in fluid communication with the reservoirs and a pressure controller coupled to the modulators and the viscometer, the pressure controller transmitting pressure commands to the modulators in response to the determined viscosity to provide a desired flow within the channel.

3. The microfluidic system of claim 1, wherein the viscometer comprises means for imposing a signal at a first location in the flow and wherein the sensor comprises means for sensing the signal at a second location.

4. The microfluidic system of claim 1, wherein the viscometer comprises at least one member selected from the group consisting of a laser Doppler velocimeter or a tracer particle videograph.

5. A microfluidic method comprising:

inducing a perturbation in a flow through a microfluidic channel of a microfluidic network by applying a pressure transient to the microfluidic network;

determining a characteristic of the flow or microfluidic network by monitoring progress of the perturbation.

6. The method of claim 5, wherein the pressure transient is applied by spontaneous injection of an introduced fluid into an injection channel of the microfluidic network.

7. The method of claim 6, wherein the spontaneous injection draws the introduced fluid into the injection channel using capillary forces between the injection channel and the introduced fluid.

8. The method of claim 5, wherein the perturbation comprises a change in a material of the flow downstream of an intersection.

9. The method of claim 8, wherein the change in material comprises a change in quantity of a fluid from a first channel, the pressure transient being applied at the first channel, the intersection providing fluid communication between the first channel and other channels of the network.

10. The method of claim 5, wherein the flow is at least in part pressure induced.

11. The method of claim 5, wherein the flow is at least in part electrically induced.

12. The method of claim 5, wherein the characteristic being determined is at least one member of a group consisting of a viscosity of the flow, and a speed of the flow.

13. The method of claim 5, wherein the characteristic being determined is a flow resistance of the channel.

14. The method of claim 5, wherein the progress of the perturbation is monitored at least in part with a sensor disposed downstream of a perturbation source location.

15. The method of claim 14, further comprising determining a speed of the flow from a first time interval and a first distance, the first time interval extending from the pressure transient to detection of the perturbation by the sensor, the first distance being along the channel between the source location and the sensor.

16. The method of claim 15, further comprising determining a second speed of a second flow from a second time interval and a second distance, the second time interval being defined in part by detection of a second flow perturbation by the sensor, the second distance being defined in part by a second perturbation source location, the first and second source locations comprising intersections between channels of the microfluidic network.

17. A microfluidic system comprising:

a body having channel walls defining a microfluidic network;

a pressure transient generator in communication with a channel intersection of the microfluidic network for initiation of a flow perturbation;

a sensor coupled to flow within the network at a sensor location; and

a processor coupled to the pressure transient generator and the sensor, the processor determining a characteristic of the flow or the network in response to detection of the perturbation at the sensor location.

18. The method of claim 17, wherein the pressure transient generator comprises a spontaneous injection channel disposable in a fluid so that capillary forces between the fluid and the channel spontaneously inject the fluid into the channel, the pressure transient comprising initiation or termination of the spontaneous fluid injection.

19. A microfluidic method comprising:

inducing a flow within a microfluidic channel of a microfluidic network; and

determining a viscosity in response to the induced flow.